2026 Workshop: Auroral Science with Heterogeneous Datasets + Rockets!

Long title
Auroral science and studies of coupled MIT dynamics using sounding rockets and hybrid heterogeneous data techniques
Conveners
Leslie Lamarche
Meghan Burleigh
Kristina Lynch
Don Hampton
Alex Mule
Cameron Westerlund
leslie.lamarche@sri.com
Description

This workshop focuses on ionospheric responses in the auroral zone contributing to system-science characterizations of the coupled magnetosphere-ionosphere-thermosphere (MIT). The heterogeneous nature of this response requires the use of a variety of observations from diverse platforms. Recent and ongoing development of new tools for incorporating data from distributed multi-instrument, multi-platform heterogeneous sources is facilitating improved understanding of auroral dynamics, new science from combining observations in novel ways, and the inclusion of these derived datasets into state-of-the art models and data assimilation techniques. This session will particularly emphasize recent results from the 2026 sounding rocket campaigns out of Poker Flat, Alaska, and how they benefit from these heterogeneous tools.

This workshop aims to gather interested members of the community together to share recent research and discuss results and future developments in a collaborative setting. It will be structured as a series of short (3-5 minute) presentations within a shared slide deck that highlight recent research with significant time at the end for moderated group discussion. Anyone interested in showing a few slides should contact the conveners so topics can be grouped and organized in advance, but all are welcome to participate in the open discussion!

Agenda

Zoom link for session:

https://sri.zoomgov.com/j/1659698460?pwd=QSNQGEmqhTTLgT3BgVGSaHUJViquFq.1

Leslie Lamarche, Introduction

Rockets/Available Data:

Rafael Mesquita EZIE; Kristina Lynch GNEISS; Alex Mule Lattice inversion; Toshi Nishimura/Kat Davidson SuperDARN; Rob Pfaff GIRAFF/BADASS; Athul Jose/Mark Conde AWESOME; Magda Moses TMA vapor release; Olga Verkhoglyadova SPHEREx

Model Enhancements/Needs

Manbharat Dhadly High-Lat Empirical Winds; Meghan Burleigh SAMI3 auroral precipitation specification; Zettergren/Snively GEMINI/MAGIC and what new needed; Haonan Wu/Kevin Pham MAGE

Data/Model Assimilation

Angeline Burrell Auroral Boundaries; Cameron Westerlund Rendering model; Kylee Branning Evolutionary algorithm; Charlie Acomb Neutrals in GEMINI; Spencer Hatch Neutral wind assimulation; Enrique Rojas-Villalba AI; Sevag Derghazarian STEVE

Justification

This workshop will bring together community efforts to study auroral dynamics. It will highlight new and developing tools for system level ionospheric science studies. The auroral examples and science questions explored here have substantial synergy with other projects; they illustrate many of the systems science questions highlighted in recent CEDAR community documents, in the context of auroral ionospheric physics. Additionally, it will further discussions on challenges and shortcomings in the present CEDAR data infrastructure and identify potential

solutions as the use of heterogeneous data for advancing science becomes more common. This has been a very successful session the last several years running with ample participation and discussion from both students and the broader community.

Related to CEDAR Science Thrusts:
Encourage and undertake a systems perspective of geospace
Develop observational and instrumentation strategies for geospace system studies
Manage, mine, and manipulate geoscience/geospace data and models
Workshop format
Short Presentations
Round Table Discussion
Keywords
aurora, coupling, heterogeneous data, ionospheric modeling
View PDF